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FINAL TECHNICAL REPORT

1991

ONR: N00014-89-J-1315 ARI: Internal Gravity Waves at Abrupt Topography

Peter Müller, Principal Investigator

The objective of the grant was to describe and model the interaction between internal gravity waves and irregular bottom topography, to determine the significance of the interaction and to identify the appropriate theoretical tools to describe the interaction in oceanographically relevant parameter ranges. The following tasks were completed:

- Derivation and evaluation of the scattering integral that describes the interaction of internal waves with random bottom topography.
- Comparison of the efficiency of reflection at a critical slope and scattering at random topography in causing a transfer of energy to high wavenumbers and boundary mixing.
- Derivation of filtered equations to study and numerically simulate the interaction of near-inertial internal gravity waves with bottom topography.
- Numerical experiments to investigate whether or not internal waves interacting with bottom topography exhibit chaotic behavior.

The results have been published in:

Muller, P., and N. Xu, 1992: Scattering of oceanic gravity waves off random bottom topography. J. Phys. Oceanography. 22, 474-488.

Xu, N., and P. Muller, 1991: Is scattering or reflection more effective in causing boundary mixing?, In: "Dynamics of Oceanic Internal Gravity Waves: Proceedings, 'Aha Huliko'a Hawaiian Winter Workshop, School of Ocean and Earth Science and Technology, Special Publication." 237-250.

Two students have been supported by the grant and produced the following master's theses:

Xu, N. Interactions of internal waves with random bottom topography and a straight slope.
(MS thesis, 1991, University of Hawaii)

ADA263795

Hieronymus, C. Chaos in ray trajectories of vertically standing internal gravity waves due to varying bottom topography.
(MS thesis, submitted, University of Hawaii)

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One research associate has been partially supported by the grant.

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